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A revision of the genus *Bryolymnia* Hampson in North America with descriptions of three new species (Lepidoptera, Noctuidae, Noctuinae, Elaphriini)

J. Donald Lafontaine[1,†], J. Bruce Walsh[2,‡], Richard W. Holland[3,§]

1 *Canadian National Collection of Insects, Arachnids, and Nematodes, Biodiversity Program, Agriculture and Agri-Food Canada, KW Neatby Bldg., C.E.F., Ottawa, Ontario, Canada K1A 0C6* **2** *Dept of Ecology and Evolutionary Biology, Biosciences West, University of Arizona, Tucson, Arizona USA 85721; Research Associate: McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, Florida, USA.* **3** *1625 Roma Ave. NE, Albuquerque, New Mexico, 87106-4514, USA*

† *urn:lsid:zoobank.org:author:2227A860-B768-4A51-8FE4-F1F3EB1CAA7F*
‡ *urn:lsid:zoobank.org:author:EFCD84CA-F880-4BC5-8AEC-BF2C7323920B*
§ *urn:lsid:zoobank.org:author:A61E522B-3A29-4407-9106-B3B13D969990*

Corresponding authors: *J. Donald Lafontaine* (Don.Lafontaine@agr.gc.ca), *J.Bruce Walsh* (jbwalsh@u.arizona.edu)

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Abstract

The three known North American species of *Bryolymnia* Hampson, 1908 are reviewed and three additional species are described as new. Two additional species, *Elaphria ensina* (Barnes, 1907) and *Cryphia viridata* (Harvey, 1876) are transferred to *Bryolymnia* as new combinations. The North American species are compared with related species in Central America. Adults of 11 species and male and female genitalia, where available, are illustrated.

Keywords

Taxonomy, *Bryolymnia*, *Elaphria*, *Bryolymnia anthracitaria*, *Bryolymnia biformata*, *Bryolymnia ensina*, *Bryolymnia marti*, *Bryolymnia mixta*, *Bryolymnia semifascia*, *Bryolymnia viridata*, *Bryolymnia viridimedia*, *Cryphia*, Arizona, California, Costa Rica, Guatemala, Mexico, New Mexico

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Introduction

The genus *Bryolymnia* Hampson, 1908 includes 17 species occurring from western United States to Argentina (Poole 1989). An additional two species transferred to *Bryolymnia*, one from *Elaphria* Hübner, one from *Cryphia* Hübner, and the three species described below, bring the total to 22 species.

The genus is associated with the Elaphrini on the basis of the weakly sclerotized area on the costa of the male valve near the apex of the digitus, and by the membranous transverse suture in the sacculus about 2/3 from its base that isolates the apical triangular sclerite that usually is more heavily sclerotized than the basal part of the sacculus.

Bryolymnia can be recognized by the large, rounded or lobed plate-like process arising from the sclerotized rod that connects the dorsoanterior rod of the clasper to the costal margin of the valve. In most species this process extends dorsally beyond the dorsal margin of the valve. Superficially, in most species of *Bryolymnia* the medial forewing area is pale and contrasts with black patches in the basal area, before or distal to the reniform spot, and/or in the costal part of the subterminal area. In some species the medial area is dark brown (and some species have forms in which the medial area may be dark or light); usually the dark patches are still contrasting, and frequently the reniform and orbicular spots are shaded with white scales.

The genus is closely related to *Hampsonodes* Nye, which has 17 species ranging from Mexico to South America. These species have an orange-red forewing with thin white antemedial and postmedial lines that unite toward the hind margin to isolate the medial area in a rounded lobe. The genitalia are similar to those of *Bryolymnia* except that the vesica is very long and coiled. The relationship of *Bryolymnia* and *Hampsonoides* remains to be resolved and it appears that numerous species currently associated with *Hampsonoides* and *Elaphria* may belong in *Bryolymnia*. One species is transferred from *Elaphria* Hübner (*B. ensina* (Barnes, 1907), comb. n.) and one (*B. viridata* (Harvey, 1876), comb. n.) is transferred from *Cryphia* Hübner.

Materials and methods

Repository abbreviations

Specimens were examined from the following collections:

AMNH American Museum of Natural History, New York, New York, USA

BMNH The Natural History Museum (statutorily, British Museum (Natural History)), London, UK

CDF Personal Collection of Clifford D. Ferris, Laramie, Wyoming, USA.

CNC Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada.

CSUC C. P. Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, Colorado, USA.

CUIC Cornell University Insect Collection, Ithaca, New York, USA.

JBW Personal collection of J. Bruce Walsh, Tucson, Arizona, USA.
NMSU New Mexico State University, Las Cruces, New Mexico, USA.
USNM National Museum of Natural History (formerly, United States National Museum), Washington, District of Columbia, USA.

Dissecting methods and genital terminology

Dissection of genitalia and terms for genital structures and wing markings follow Lafontaine (2004).

Bryolymnia Hampson, 1908

Type species. *Dacira roma* Druce, 1894, by subsequent designation by Hampson 1910.

Diagnosis. Adults. Males and females of similar size; forewing length 9–18 mm. **Head –** Male antenna filiform to beadlike, occasionally very slightly biserrate; setae tending to group into tuft on each side in species with slightly biserrate antenna. Female antenna filiform, minutely setose ventrally. Frons rounded and smooth, or slightly bulging in middle, covered with short broad scales. Eye rounded, surface smooth, without surface hair. Labial palpus porrect, apical segment 0.3–0.4 × as long as second segment. **Thorax –** *Thorax*: covered with broad apically serrated scales; scales tend to form slightly raised dorsal tuft on prothorax and spreading, slightly doubled dorsal tuft on metathorax. *Wings*: Forewing ground color typically of brown and black with areas of white or pale green, especially medial area. Hindwing white to fuscous. *Legs*: Covered with short broad scales; tarsi with three ventral rows of spiniform setae. **Abdomen –** Base of abdomen with basal abdominal brushes, levers, levers and pockets in most species. Eighth abdominal sternite of male with slightly eversible coremata with a tuft of long setae. **Male genitalia –** Uncus cylindrical, thin, tapered from base to spine-like apex. Tegumen broad, truncated apically, ventrally expanded on posterior surface into round projecting lobe on each side. Valve long and mainly parallel sided, most often bent dorsally at point of weakness of costa; costa a sclerotized thickening on dorsal margin of valve, but dorsal margin with weakly sclerotized area at point where digitus bends away from costa; a slightly expanded cucullus with partial or complete corona on apical margin; digitus mainly a sclerotized band fused to mesial surface of valve adjacent and partially fused with costa, except at weakened area of costa where digitus bends obliquely posteroventrally across valve with apex tapered and free from surface of valve; apical part of clasper a simple curved (or slightly S-shaped) rod projecting posteriorly on inner surface of valve, with minute teeth or short subbasal process in some species; ventral base of clasper extending as a thin sclerotized rod to apex of sacculus; dorsal base of clasper diagnostic, expanded into large, rounded or lobed heavily sclerotized plate extending above dorsal margin of valve; sacculus 0.3–0.4 × length of valve, mainly weakly sclerotized, with membranous transverse suture at 2/3 from base and with apical 1/4 more heavily sclerotized. Aedeagus weakly and patchily sclerotized, often with apical part of aedeagus extended as variably sclerotized straps onto base of vesica. Vesica short, about 1.5–2.0 × length of aedeagus; vesica variably armed with "brushes" of long

thin spines, stout cornuti, often projecting obliquely from a strongly sclerotized base, or with fields of minute spinules. **Female genitalia** – Corpus bursae thin and membranous, rounded, oval, or elongated, with one or two long signa in some species. Ductus seminalis at posterior end of corpus bursae in most species. Appendix bursae absent in most species; one species in North America (*B. semifascia*) with rounded, sclerotized appendix bursae at junction of corpus bursae and ductus bursae. Ductus bursae with length, shape, and amount and position of sclerotization highly variable and species-specific. Ventral wall of ostium bursae sclerotized and forming a plate that projects posteriorly. Anterior and posterior apohyses rod-like, 1.0–1.5 × length of abdominal segment eight. Anal papillae lightly sclerotized rounded posteriorly, covered with mixture short and long setae.

Key to species of *Bryolymnia* of North America north of Mexico

1. Forewing with green* shading in medial area **2**
– Forewing with yellow-brown to dark-brown shading in medial area (a white patch in lower part of medial area in one species) **4**
2. Forewing ground color almost entirely green..... ***B. viridata***
– Forewing with green or white shading confined to medial area..... **3**
3. Middle part of antemedial line with squared off indentation basal to claviform spot; lower part of antemedial line extending outward as lobe into medial area; forewing length 14 to 18 mm..... ***B. viridimedia***
– Middle part of antemedial line with small rounded indentation basal to claviform spot; lower part of antemedial line extending inward, so green shading in medial extends almost to wing base; forewing length 11 to 13 mm.... ***B. marti***
4. Forewing with black streak extending from orbicular spot, through lower part of reniform spot to subterminal line ..... ***B. anthracitarea***
– Forewing with dark patch or streak, if present, between reniform spot and subterminal line **5**
5. Dorsum of thorax with white scales; lower 1/2 of medial area usually with white shading..... ***B. semifascia***
– Dorsum of thorax brown or black; medial area without white shading..... **6**
6. Forewing with basal, antemedial, medial, and subterminal areas mottled with pale-brown and blackish-brown shading ..... ***B. mixta***
– Forewing with medial area orange brown to brown, contrasting with blackish-brown shading in antemedial and subterminal areas **7**
7. Forewing with medial area brown or orange brown with one or two black streaks between reniform spot and subterminal line; upper 1/2 of antemedial area dark blackish brown; subterminal area brown and black ..... ***B. ensina***
– Forewing with medial area mainly yellowish brown or brown with contrasting dark-brown or blackish-brown shading in basal and antemedial areas and between reniform spot and postmedial line; subterminal area brown with extensive hoary-gray shading..... ***B. biformata***

* Note – Green color changes to yellowish white in preserved specimens after exposure to excessive humidity.

Systematics

***Bryolymnia viridimedia* (Smith, 1905)**
Figs 1–3, 25, 34

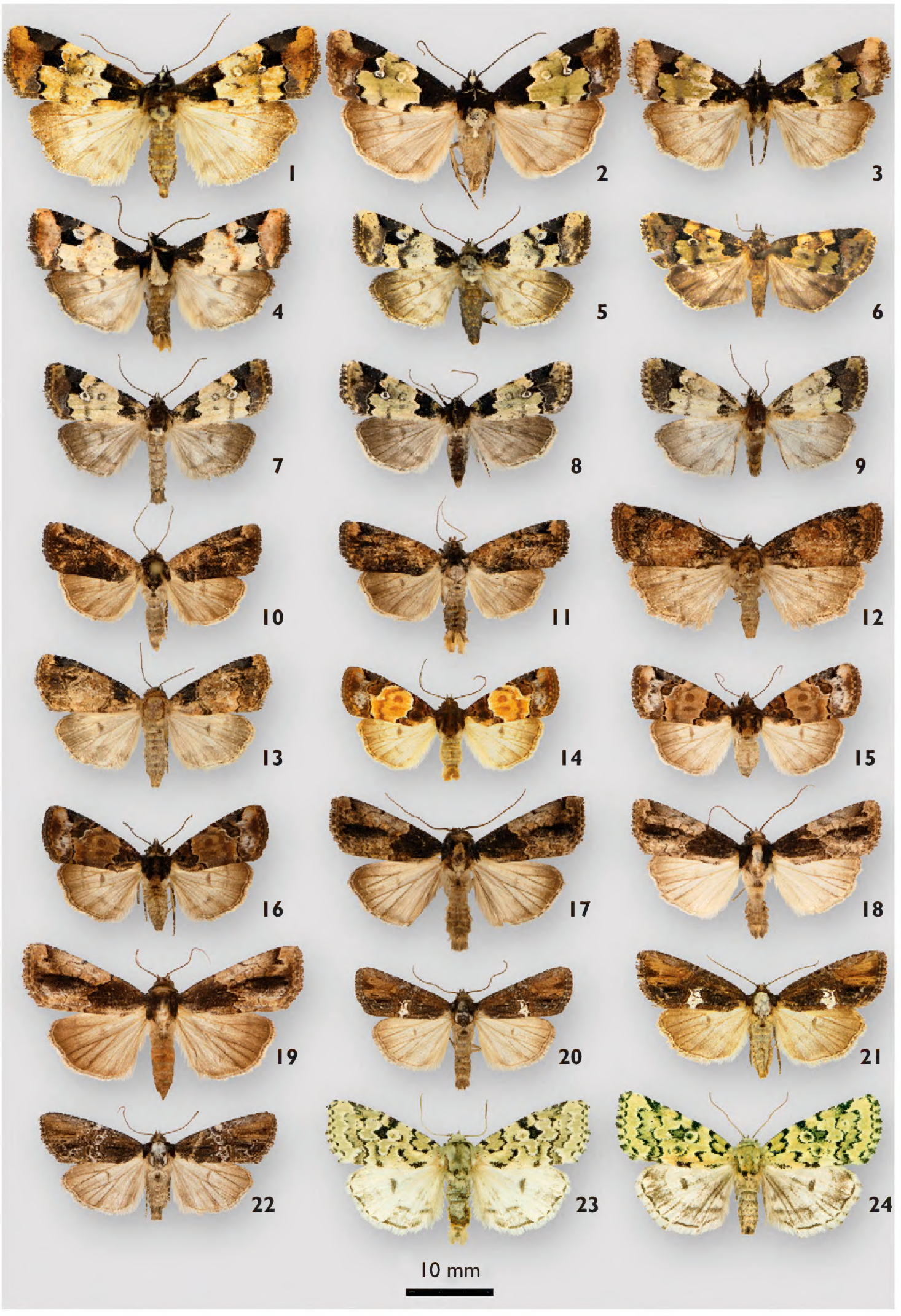
Bryophila viridimedia Smith 1905: 188.

Type material. Holotype ♂. Arizona, Cochise Co. AMNH, examined.

Other material examined and distribution. Mexico: States of Chihuahua, Durango (Sierra Madre Occidental), Mexican Federal District. **USA: Arizona:** Cochise Co. (Huachuca Mts) and Santa Cruz Co. (Santa Rita Mts).

Diagnosis. Superficially *Bryolymnia viridimedia* can be recognized by large size (forewing length: 14–18 mm), extensive pale-green shading in the medial area, and the course of the antemedial line on the forewing. On the forewing the antemedial line has a rectangular indentation between the cubital and anal veins, and an outward loop below the anal vein; the basal area is black, except for the area below the anal vein, which is pale green; the subterminal and terminal areas are mainly brown with gray scales (mainly adjacent to the lower part of the postmedial line, and with a dark-fuscous truncated wedge-shaped patch on the costa. The hindwing is pale fuscous with darker shading on the veins, discal spot, postmedial line, and wing margin. *Bryolymnia viridimedia* is similar to *B. poasia* Schaus, 1911 from Costa Rica (Figs. 4, 5, 26, 35) and *B. marti* (described below). *Bryolymnia poasia* is smaller (forewing length: 12–14 mm) than *B. viridimedia*, the forewing medial area is white or whitish buff, not green, and the genitalia differ. **Male genitalia.** In *B. viridimedia* the cucullus is short, similar in width to the rest of the valve, and has a partial corona on the dorsal-apical margin; the clasper is a simple finger-like process with a large rounded or slightly lobed sclerotized plate on the dorsal-anterior rod at the base of the clasper. The vesica has two dense patches of long spines ventrolaterally on the right, one postmedial and one preapical, the latter on a short diverticulum. In *B. poasia* (Fig. 26) the valve is straighter and narrower toward the base, the rounded sclerotized plate on the dorsal-anterior rod at the base of the clasper is larger and more rounded, and the vesica is short with a single large basal cornutus on a large base. **Female genitalia.** The corpus bursae is oval, 4 × as long as abdominal segment eight and 0.8 × as long as the ductus bursae. The ductus bursae is long and narrow with irregular sclerotized ridges longitudinally, especially mesially and anteriorly. The ostium bursae has an elongated heavily sclerotized plate in the ventral wall with rounded sides and a deep central notch posteriorly.

Distribution and biology. *Bryolymnia viridimedia* occurs from southeastern Arizona (Huachuca and Santa Rita Mountains) southward in the Sierra Madre Occidental to the Mexico City area. Collecting dates range from early July to mid-September. *Bryolymnia bicon* occurs south of the range of *B. viridimedia*, from the State of Veracruz in central-eastern Mexico southward to Costa Rica.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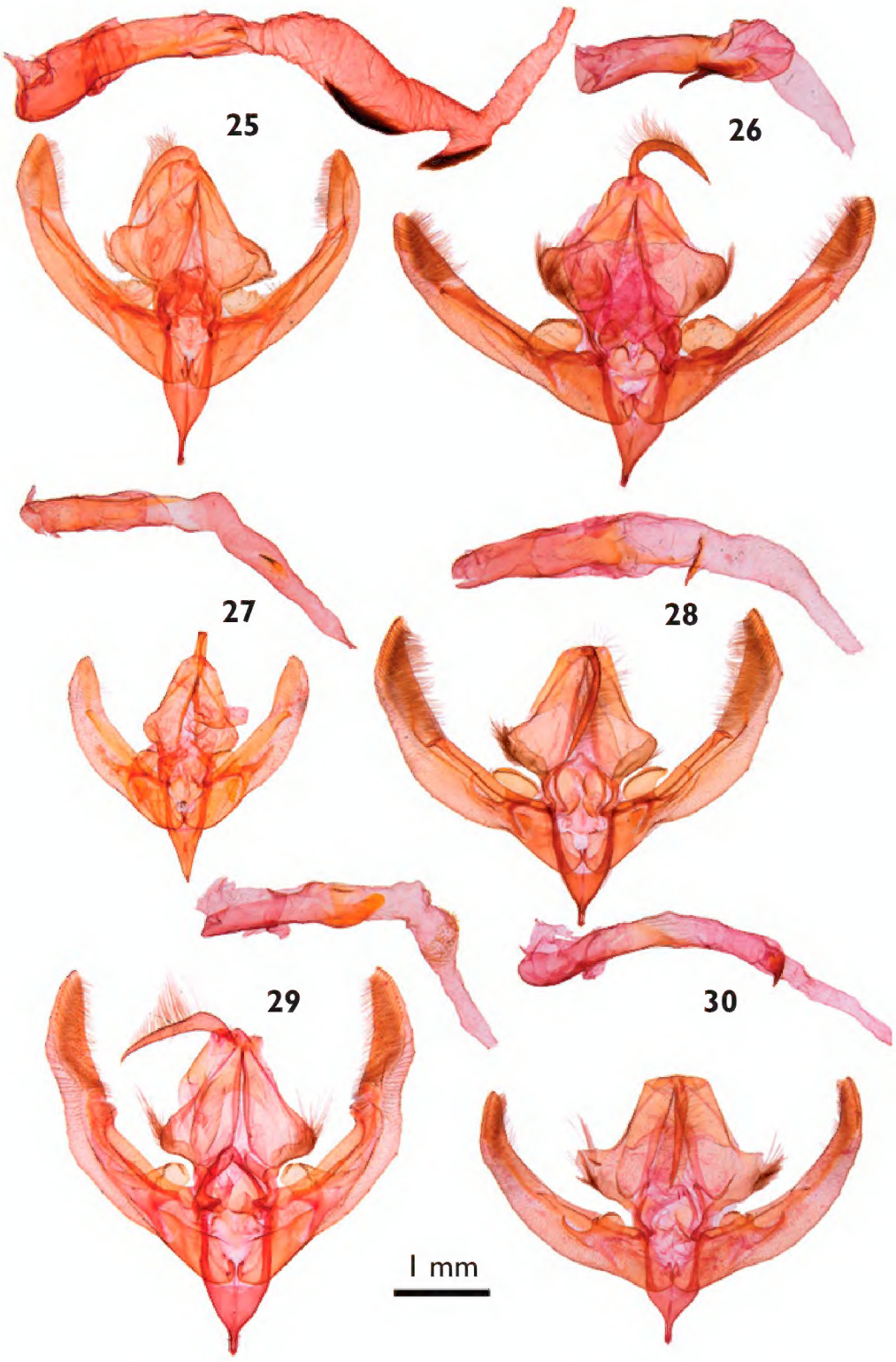
***Bryolymnia marti* Holland, sp. n.**
urn:lsid:zoobank.org:act:24499114-5236-4144-8469-68EED1B3E496
Figs 7–9, 27, 36

Type material. Holotype ♂. New Mexico, Bernalillo Co., Manzanita Mts. south of Tijeras, 7500', Locust site, Oak Flat Picnic Area, 17 June 2007, R. Holland & M. Romero. CNC. **Paratypes:** 16 ♂, 19 ♀. **USA, Arizona.** Graham Co., Mt. Graham, Pinaleno Mts., 9000', Cunningham Campground, 26 June 2007, J. B. Walsh (1 ♂, 1 ♀). **New Mexico.** Same locality and collectors as for holotype, 23 May 2006, 14 June 2006, 1 July 2006, 17 June 2007 (9 ♂, 11 ♀); Grant Co., Mimbres Mts., Spring Canyon, 7000', 24 June 2008 (2 ♂, 1 ♀), 22–23 June 2009 (3 ♂, 6 ♀), C. D. Ferris; Otero Co., Cathey Canyon Overlook, 8500', Route 6563 12.4 mi S of junction with Rt. 330 south of Cloudcroft, 16 June 2006, G. S. Forbes, coniferous forest (1 ♂). Paratypes deposited in AMNH, BMNH, CDF, CSUC, CNC, JBW, NMSU, USNM.

Other material examined. Mexico. Durango. 10 mi W El Salto, 9000', 6–23 June 1964, J. E. H. Martin & W. C. McGuffin (5 ♀).

Etymology. The species is named in honor of Marti Romero, who first collected the species and was extremely helpful in collecting most of the type series.

Figures 1–24. *Bryolymnia* adults. **1** *B. viridimedia* ♀, Mexico, Durango, 10 mi W El Salto, 9000' **2** *B. viridimedia* ♀, Arizona, Santa Cruz Co., Santa Rita Mts., Madera Canyon, 5800' **3** *B. viridimedia* ♀, Mexico, Zacualpan **4** *B. poasia* ♂, Costa Rica, San Jose, San Gerardo de Dota, 2230 m **5** *B. poasia* ♀, Costa Rica Prov. Cartago, R. F. Los Santos, 2400 m **6** *B. picturata* holotype ♀, Mexico, Veracruz, Las Vigas **7** *B. marti* holotype ♂, New Mexico, Bernalillo Co., Manzanit Mts. south of Tijeras, 7500' **8** *B. marti* ♀, New Mexico, Bernalillo Co., Manzanit Mts. south of Tijeras, 7500' **9** *B. marti* ♂, Arizona, Graham Co., Pinaleno Mts., Cunningham Campground, 9000' **10** *B. mixta* holotype ♂, Arizona, Santa Cruz Co., Patagonia Mts., rest stop on Arizona Hwy 82, 3 mi W of Patagonia, 4000' **11** *B. mixta* ♂, Arizona, Santa Cruz Co., Patagonia Mts, Patagonia roadside rest, Hwy mile 15.6 **12** *B. ensina* ♀, Mexico, Durango, 10 mi W El Salto, 9000' **13** *B. ensina* ♀, New Mexico, Grant Co., Pinos Altos Mts., south end of Cherry Creek Campground, 6753' **14** *B. biformata* holotype ♂, Arizona, Santa Cruz Co., Santa Rita Mts., Madera Canyon, 5800' **15** *B. biformata* paratype ♀, Arizona, Santa Cruz Co., Santa Rita Mts., Madera Canyon, 5800' **16** *B. biformata* paratype ♀, Arizona, Santa Cruz Co., Santa Rita Mts., Madera Canyon, 5800' **17** *B. anthracitaria* paratype ♂, Arizona, Cochise Co., Huachuca Mts, Ash Canyon, 5100' **18** *B. anthracitaria* paratype ♂, Arizona, Santa Cruz Co., Pena Blanca, 3950' **19** *B. anthracitaria* paratype ♀, Arizona, Santa Cruz Co., Santa Cruz Co., Santa Rita Mts., Madera Canyon **20** *B. semifascia* ♂, Cochise Co., Huachuca Mts, Ash Canyon, 5100' **21** *B. semifascia* ♀, Colorado, Grand Co., Radium State Wildlife Area, 7040' **22** *B. semifascia* ♀, New Mexico, Socorro Co., Bosque del Apache Nacional Wildlife Refuge **23** *B. viridata* ♂, California, Sonoma Co., Petaluma **24** *B. viridata* ♀, California, Sonoma Co., Petaluma.



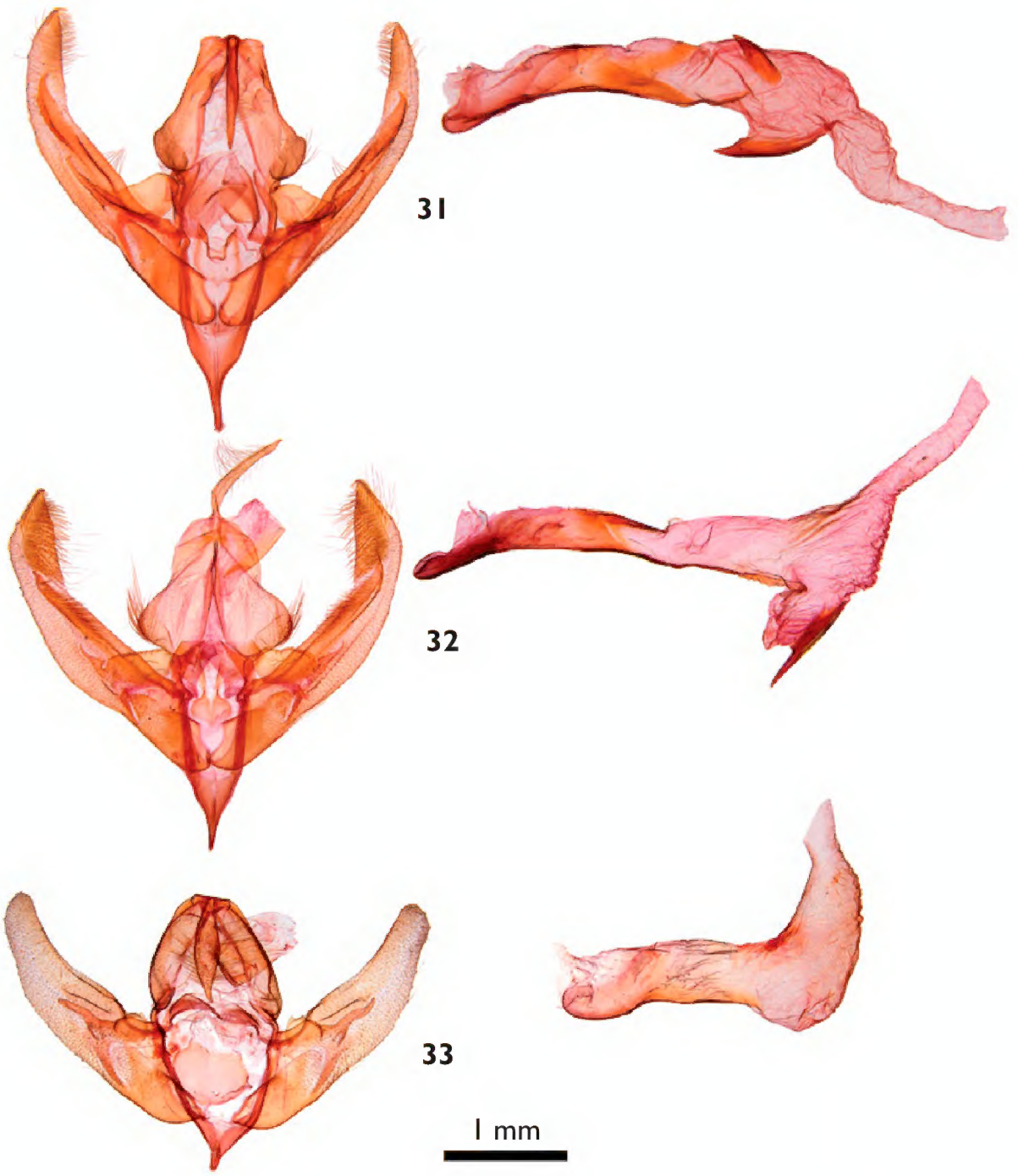
Figures 25–30. *Bryolymnia* male genitalia. **25** *B. viridimedia* **26** *B. poasia* **27** *B. marti* **28** *B. mixta* **29** *B. ensina* **30** *B. biformata*.

Diagnosis. *Bryolymnia marti* can be recognized by small size (forewing length: 11–13 mm), the pale-green shading in the medial area, mainly blackish-gray shading in the subterminal and terminal areas, except near the forewing apex, and by the course of the antemdial line, which has a shallow, rounded indentation between the cubital and anal veins, and curves in toward the wing base at the anal vein. It is most closely related to *B. picturata* (SE Mexico) (Fig. 6) and *B. poasia* (Costa Rica) (Figs. 4, 5, 26, 35). *Bryolymnia marti* differs from *B. picturata* in having paler green shading in the medial area, mainly dark fuscous shading in the subterminal and terminal areas,

instead of gray-green shading, a less prominent medial line, and a smaller black dot in the orbicular spot.

Description. Adults. Male and female similar in size, color, and maculation. **Head** – Male antenna with flagellomeres very slightly swollen laterally; setae tending to group into two or three clusters on each side of each segment. Palpi and head a mixture of broad, apically serrated pale-brown and blackish-brown scales predominating. **Thorax** – Covered with scales similar to those on head, except blackish-brown scales predominating; a slightly divided dorsal tuft on metathorax. *Legs*: Covered with blackish-brown scales with white band in middle of tibiae and at apices of tarsal segments. Tibia without spiniform setae. *Wings*: Forewing length: 11–12 mm. Dorsal forewing ground color black in basal and antemedial area, pale whitish green in medial area, and a mixture of black, brown and greenish gray in subterminal and terminal areas; subterminal line with concave notch between cubital and anal veins, and bending abruptly toward wing base below anal vein; medial line obscure or diffuse in most specimens; postmedial line black, slightly serrated with a series of short wedge-shaped extensions projecting into medial area; subterminal line evident only near costa where blackish gray in upper part of subterminal area contrasts with paler greenish gray in upper part of terminal area; terminal line black; fringe dark gray with white scales at end of veins; orbicular spot usually obscure but outlined partially or completely in black in some specimens; reniform spot shaped like figure 8 but upper part usually obscure, lower part white with black outline and small black central dot.

Dorsal hindwing white with varying amount of fuscous, especially on veins, discal spot, postmedial line, and wing margin; females averaging slightly darker than males; fringe fuscous with white basal line and sometimes with white on outer margin. **Male genitalia** – Uncus cylindrical, tapered to spine-like apex. Valve somewhat oval, broad mesially, tapered apically with dorsal margin angled upward at membranous part of costa; cucullus with weak corona on apical half of outer margin; digitus long and tubular, fused to costal margin of valve to costal angle, then free of valve and slightly spatulate; apical part of clasper slender and very slightly upcurved, dorsal part of basal rod extending to dorsal margin of valve enlarged into apically rounded process extending beyond dorsal margin of valve; apical part of sacculus beyond postmedial suture more heavily sclerotized than basal part. Aedeagus irregularly sclerotized with narrow sclerite extending onto vesica ventrally to base subbasal bend in vesica. Vesica about 1/2 as long as aedeagus with postmedial cornutus tapered to sharp point. **Female genitalia** – Corpus bursae membranous, oval, slightly shorter than ductus bursae, with single long signum ventrally and ductus seminalis arising on right near junction with ductus bursae. Ductus bursae long and slender, membranous except for lightly sclerotized band about 3/4 from posterior end. Ostium bursae with broad sclerotized plate in ventral wall with deeply concave posterior margin.



Figures 31–33. *Bryolymnia* male genitalia. **31** *B. anthracitaria* **32** *B. semifascia* **33** *B. viridata.*

Distribution and biology. *Bryolymnia marti* occurs from central New Mexico and east-central Arizona southward to the State of Durango in northern Mexico. Adults have been collected between early June and early July in conifer forests.

***Bryolymnia mixta* Lafontaine & Walsh, sp. n.**
urn:lsid:zoobank.org:act:1F7549F2-FF28-406A-8DEC-AC617DBA532E
Figs 10, 11, 28

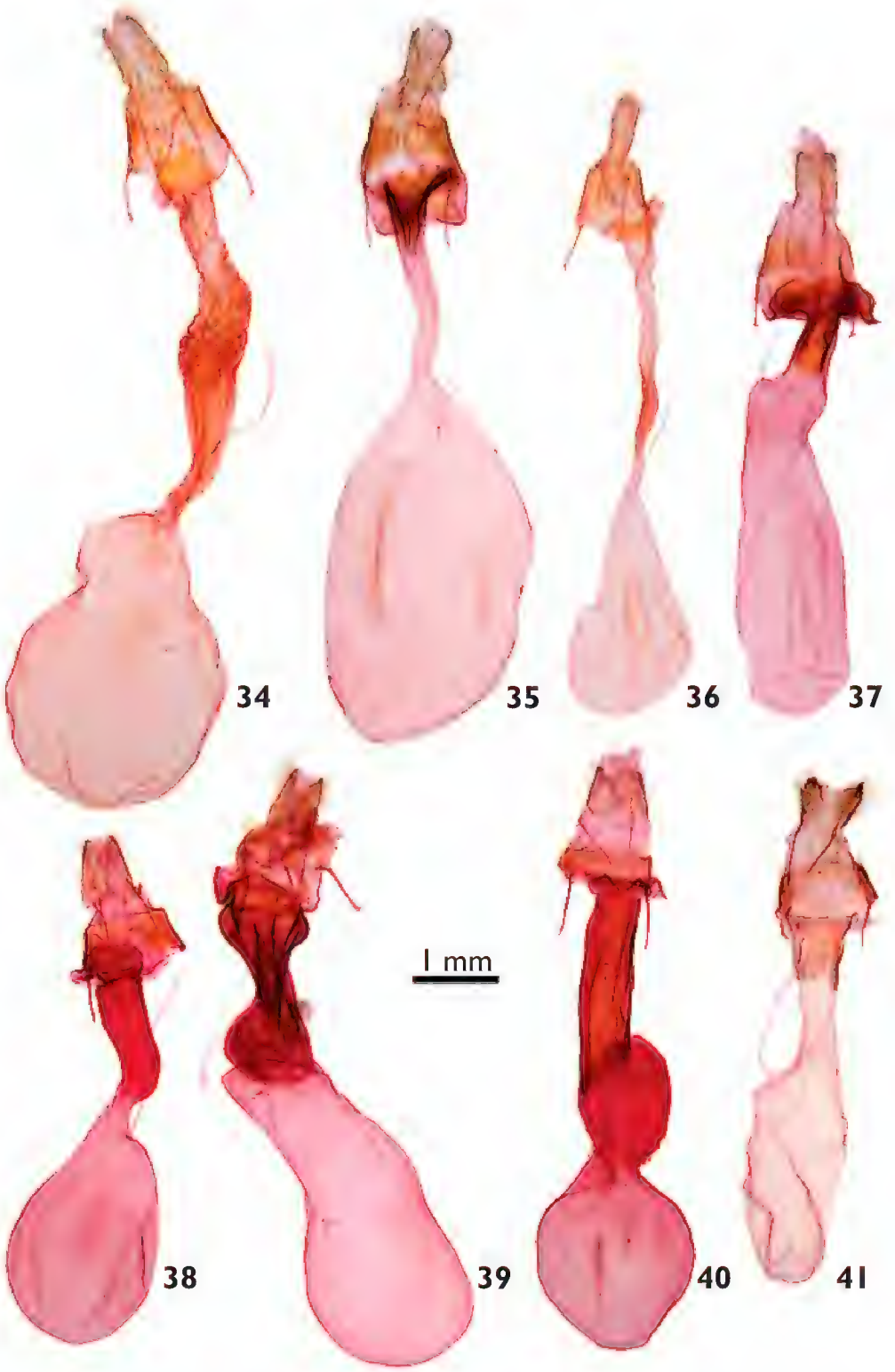
Type material. Holotype ♂. Arizona, Santa Cruz Co., Patagonia Mts., rest stop on Arizona Hwy. 82, 3 mi W of Patagonia, 4000', 11 July 2002, B. Walsh. CNC. **Paratype:** 1 ♂. **USA, Arizona.** Santa Cruz Co., Patagonia Mts., Patagonia roadside rest, Hwy mile 15.6, 27 June 2006, B. Walsh, riparian habitat. Paratype deposited in JBW.

Etymology. The name *mixta* is from the Latin *mixtus*, meaning mixed or mingled and refers to the blotchy confused appearance of the forewing maculation.

Diagnosis. *Bryolymnia mixta* can be recognized the mottled black and brown forewing pattern that obscures the maculation. It is most similar to *B. ensina*, but in *B. mixta* there is much more black shading in the medial area than the basal area, the opposite of *B. ensina*. In the male genitalia the sclertoized plate at the base of the clasper is somewhat mushroom shaped, narrow basally and abruptly expanded apically, and the apex of the digitus also is abruptly expanded. In the vesica there is a narrow sclerotized rod that extends from the apex of the aedeagus to a long spine-like medial cornutus. In *B. ensina* the sclerotized plate on the basal arm of the clasper is tapered to a broadly rounded apex, and the digitus is tapered apically. In the vesica of *B. ensina* there is a broad, heavily-sclerotized lobe extending from the apex of the aedeagus onto the vesica and the apical 1/2 of the vesica is covered with minute spines.

Description. Adults. Female unknown. **Head** – Male antenna with flagellomeres very slightly swollen laterally; setae tending to group into two or three clusters on each side of each flagellomere. Palpi and head a mixture of broad apically serrated pale-brown and blackish-brown scales, the latter predominating. **Thorax** – Covered with scales similar to those on head, except blackish-brown scales predominating; a slightly divided dorsal tuft on metathorax. *Legs*: Covered with blackish-brown scales with white band in middle of tibiae and at apices of tarsal segments. Tibia without spiniform setae. *Wings*: Forewing length: 12 mm (2 specimens). Dorsal forewing ground color brown heavily dusted with blackish-brown scales, especially in lower part of medial area, to a lesser degree in lower part of basal and subterminal areas, and forming a dark streak distal to reniform spot and in costal part of subterminal area; antemedial and postmedial lines black but partially obscured by scattered black scales on forewing; reniform and orbicular spots with some gray scales but mainly obscured by mottled ground color; subterminal line and apical part of terminal area pale brown; fringe dark gray. Dorsal hindwing fuscous, darker on discal spot, veins, and wing margin. Fringe pale buff with fuscous medial line. **Male genitalia** – Uncus cylindrical, tapered to spine-like apex. Valve strap-like with ventral margin slightly convex near middle and dorsal margin slightly angled at point of weak sclerotization; apex of valve with well-developed corona on outer margin; digitus long and tubular, mainly fused to costal margin of valve except for short spatulate apex; apical part of clasper slender and upcurved, dorsal part of basal rod extending to dorsal margin of valve enlarged into apically rounded process with narrow base, somewhat mushroom shaped; apical part of sacculus beyond postmedial suture slightly more heavily sclerotized than basal part. Aedeagus irregularly sclerotized with narrow sclerite extending onto vesica on right to base of submedial cornutus. Vesica about as long as aedeagus with tapered cornutus about 2/3 as long as width of vesica. **Female genitalia** – Unknown.

Distribution and biology. *Bryolymnia mixta* is known only from the Patagonia Mountains in southeastern Arizona. Adults were collected in late June and mid-July.



Figures 34–41. *Bryolymnia* female genitalia. **34** *B. viridimedia* **35** *B. poasia* **36** *B. marti* **37** *B. ensina* **38** *B. biformata* **39** *B. anthracitaria* **40** *B. semifascia* **41** *B. viridata*.

***Bryolymnia ensina* (Barnes, 1907), comb. n.**
Figs 12, 13, 29, 37

Oligia ensina Barnes 1907: 12.
Calymniodes obliquirena Hampson 1918: 151.

Type material. *Oligia ensina*: **holotype** ♂, USNM, examined. Type locality: USA, Arizona, [Cochise Co.], Huachuca Mts. *Calymniodes obliquirena*: **holotype** ♂, BMNH, examined. Type locality: USA, Arizona, [Cochise Co., Huachuca Mts.], Palmerlee.

Other material examined and distribution. Mexico: State of Durango (Sierra Madre Occidental). **USA: Arizona**: Cochise Co. (Huachuca Mts); **New Mexico:** Grant Co. (Pinos Altos Mts).

Diagnosis. *Bryolymnia ensina* is a medium-sized species (forewing length: 12–14 mm), with a mainly brown or orange-brown forewing with blackish-brown shading in the upper half of the antemedial area, in the subterminal area, especially toward the costa, and as one or two dark streaks between the reniform spot and the subterminal line. It looks like a large form of *Bryolymnia biformata*, but the dark shading on each side of the paler medial area is much more patchy than in *B. biformata*. The hindwing is pale fuscous basally with darker fuscous on the veins, discal spot, and on the outer 1/3 of the wing. *Bryolymnia ensina* appears to be most closely related to *B. mixta* on the basis of the male genitalia, but the details of male genitalia and the mainly pale medial area of the forewing allow the two species to be readily separated. **Male genitalia.** The male genitalia are similar to those of *B. mixta*, but in *B. ensina* the uncus is swollen dorsally toward the base, not cylindrical, the dorsal process from the basal arm of the clasper is rounded and tapered, not basally constricted, the digitus is fused to the inner surface of the valve, not free of the valve and apically spatulate as in *B. mixta*, and the clasper has a short dorsal branch about 1/3 from the base. The sclerotized extension of the aedeagus is broad, heavily sclerotized, and apically rounded, unlike the slender extension in *B. mixta*. The vesica has no cornutus, unlike many other species of *Bryolymnia*, and the apical half of the vesica is covered with minute spines. **Female genitalia.** These are most likely to be similar to the female genitalia of *B. mixta*, which are unknown. The ductus bursae is short, 1/3 as long as the corpus bursae, and the posterior 2/3 is heavily sclerotized and fused into a broad posteriorly convex ostium bursae with a small pouch on each side of the ostium. The corpus bursae is oblong, 3 × as long as wide, with two long thin signa.

Distribution and biology. *Bryolymnia ensina* occurs in coniferous forests from southeastern Arizona (Huachuca Mts.) and southwestern New Mexico (Pinos Altos Mountains) southward in the Sierra Madre Occidental to the State of Durango. Collecting dates range from mid-June to mid-July.

Bryolymnia biformata **Lafontaine & Walsh, sp. n.**
urn:lsid:zoobank.org:act:972C9617-5788-4CD9-B565-61ACC6A0F1C3
Figs 14–16, 30, 38

Type material. Holotype ♂. Arizona, Santa Cruz Co., Santa Rita Mts., Madera Canyon, 5800', 30 June 1960, J. G. Franclemont [pale form]. CUIC. **Paratypes:** 73 ♂, 227 ♀. **USA, Arizona.** Cochise Co., Huachuca Mts., Cave Canyon, 6075', 19 July 1995, Thomas E. Dimock (1 ♀). Santa Cruz Co., same locality and collector as for holotype, 16 June – 12 July 1960 (66 ♂, 207 ♀); Santa Cruz Co., Patagonia Mts., Harshaw, 4900', UV/MV lights, 3 August 2007, B. Walsh (1 ♀); Santa Cruz Co., Santa Rita Mts., Madera Canyon, 4800', 2–24 July 1959, 14 June – 23 July 1960, J. G. Franclemont (7 ♂, 18 ♀). Paratypes deposited in CDF, CNC, CUIC, JBW, USNM.

Etymology. The name *biformata* is from Latin and refers to the two color forms of this species.

Diagnosis. *Bryolymnia biformata* can be recognized by the contrast between the gray-brown or pale yellow-brown shading of most of the medial area compared to the blackish-brown shading in the basal and subterminal areas and in the medial area between the reniform spot and subterminal line. The contrast in the shading is much more sharply defined than in either *B. ensina* or *B. mixta*, although *B. biformata* went unrecognized for many years because the two forms were treated as additional forms of *B. ensina*. The genitalia are significantly different from those of *B. ensina*. The male genitalia are similar to those of *B. ensina* in that the uncus is swollen basally, the clasper has a dorsal process near the base, and the sclerotized lobe on the basal extension of the clasper is tapered and rounded. However, the vesica in *B. biformata* does not resemble that of *B. ensina* but is more like that of *B. mixta* in having a postmedial cornutus, although much stouter and angled, and no apical spines. The valve is tapered apically, unlike that of either *B. ensina* or *B. mixta*. In the female genitalia the ductus bursae is almost as long as the corpus bursae, and the ostium bursae, unlike that in *B. ensina*, lacks a pouch on each side of the ostium bursae.

Description. Adults. Male and female similar in size, color, and maculation. **Head** – Male antenna with flagellomeres very slightly swollen laterally; setae tending to group into two or three clusters on each side of each segment. Palpi and head mainly of broad apically serrated dark-brown scales with a speckling of gray scales on sides of palpi. **Thorax** – Scales similar in shape to those on head, dark brown to blackish brown, similar in color to basal area of forewing; a slightly divided dorsal tuft on metathorax. *Legs*: Covered with gray-brown scales with white band in middle of tibiae and at apices of tarsal segments. Tibia without spiniform setae. *Wings*: Forewing length: 11–12 mm. Dorsal forewing ground color variable by area; basal and antemedial areas and medial area between reniform spot and postmedial line dark brown to blackish brown; remainder of medial area usually either pale orange brown, reddish brown, with a few intermediates; subterminal and terminal areas a mixture of brown, hoary gray, and blackish brown with hoary gray predominating in subterminal area, brown in terminal area, and blackish brown mainly forming a patch in subterminal area adjacent to costa; basal, antemedial and postmedial lines black, narrowly bordered by a pale line; subterminal line diffuse; reniform, orbicular, and claviform spots, and medial line, a shade darker than medial area ground color, not contrasting, but reniform spot sometimes with partial pale-gray outline; fringe dark gray brown with tiny yellow dots at base between wing veins. Dorsal hindwing pale fuscous with darker on discal spot, veins, postmedial line, and wing margin. Fringe pale buff with fuscous medial line. **Male genitalia** – Uncus mainly cylindrical, slightly swollen dorsally toward base, tapered to spine-like apex. Valve strap-like, mainly parallel sided but slightly tapered apically; apex of valve with corona on outer margin; digitus mainly fused to costal margin of valve except for short tapered apex; apical part of clasper slender and upcurved, with dorsal process near base; dorsal part of basal rod extending from clasper to dorsal margin of valve a large rounded process extending beyond dorsal margin of valve; apical part of sacculus beyond post-

medial suture slightly less heavily sclerotized than basal part. Aedeagus irregularly sclerotized, with narrow sclerite extending onto vesica on right as far as base of cornutus. Vesica about as long as aedeagus, with large basally-stout, apically-angled postmedial cornutus. **Female genitalia** – Corpus bursae oval, slightly longer than ductus bursae with ductus seminalis at posterior end of corpus bursae. Ductus bursae with posterior 3/4 heavily sclerotized, slightly wider posteriorly, with irregularly sclerotized suture separating ductus bursae from heavily sclerotized rounded plate of ostium bursae.

Distribution and biology. *Bryolymnia biformata* is known only from the Huachuca, Patagonia, and Santa Rita Mountains in southeastern Arizona. Adults have been collected between mid-June and late July.

Bryolymnia anthracitaria **Ferris & McFarland, 2007**

Figs 17–19, 31, 39

Bryolymnia anthracitaria Ferris & McFarland 2007: 196

Type material. Holotype ♂. Arizona, Cochise Co., Huachuca Mts., Ash Canyon, 31°23.27'N, 110°14.28'W, 5170' (1577 m), 1015 July 2006, N McFarland. USNM, examined.

Other material examined and distribution. USA: Arizona: Cochise Co. (Huachuca Mts) and Santa Cruz Co. (Atascosa, Patagonia, and Santa Rita Mts).

Diagnosis. *Bryolymnia anthracitaria* can be recognized by its grayish-brown forewing with almost all of the basal and antemedial areas blackish brown and with a thick blackish-brown streak extending from the orbicular spot (in some specimens from the antemedial line) to the terminal line. The reniform and orbicular spots are outlined in black and the postmedial line is black but the lines are thin, so they tend to be partially covered and obscured by the prominent dark streak. The subterminal line is pale and usually obscure, being most evident near the costa because of black shading in the upper part of the subterminal area adjacent to the line. Forewing length ranges from 12–16 mm with males averaging 1.7 mm larger than females (Ferris and McFarland 2007). In the male the hindwing is pale fuscous with darker fuscous on the veins, discal spot, and wing margin. In the female the hindwing is dark fuscous, slightly paler toward the wing base. **Male genitalia.** These are similar to those of *Bryolymnia biformata*, but in *B. anthracitaria* the dorsal surface of the clasper is serrated, the clasper is without a basal dorsal process, the digitus is much larger and widens apically into a plate that is serrated on both sides, and the vesica is more globular with two stout cornuti. **Female genitalia.** These also are similar to those of *Bryolymnia biformata*, but in *B. anthracitaria* the corpus bursae is more elongated and the ductus bursae is completely sclerotized and markedly expanded anteriorly and posteriorly.

Distribution and biology. *Bryolymnia anthracitaria* is known only from southeastern Arizona where it has been collected in oak scrub grassland. Collecting dates range from late June to late August.

***Bryolymnia semifascia* (Smith, 1900)**
Figs 20–22, 32, 40

Chytonix semifascia Smith 1900: 415.

Type material. Lectotype ♂. USNM, examined. Designated by Todd (1982). Type locality: USA, Colorado, Garfield Co.

Other material examined and distribution. USA: Arizona: Cochise Co. (Huachuca Mts), Graham Co. (Pinaleno Mts), Pima Co. (Santa Catalina Mts), Santa Cruz Co. (Atascosa, Patagonia, and Santa Rita Mts), and Yavapai Co.; Colorado: Grand Co. and Garfield Co. New Mexico: Los Alamos Co., and Socorro Co.; Utah: San Juan Co.

Diagnosis. *Bryolymnia semifascia* can be recognized by the brown forewing with blackish-brown shading and streaks, especially toward the hind margin of the wing, and usually with a contrasting white patch in the lower part of the medial area. The white patch, the best character to recognize this species, may consist of only a few scattered white scales, but in most specimens it covers most, sometimes all, of the lower half of the medial area. In many specimens light-gray scales form partial highlights to the otherwise obscure reniform and orbicular spots, and the postmedial and subterminal lines. Forewing length ranges from 11 to 14 mm. The hindwing is pale fuscous with darker fuscous on the veins, discal spot, postmedial line and wing margin with that of the female only slightly darker than in the male. **Male genitalia.** These are most similar to those of *Bryolymnia anthracitaria*. As in *B. anthracitaria* the dorsal surface of the clasper is serrated, the clasper is without a subbasal process, and the digitus is large and heavily sclerotized. The main differences from the genitalia of *B. anthracitaria* are that the dorsal surface of the digitus is densely hairy, the clasper in much smaller, and the vesica has only a single slender tapered cornutus. **Female genitalia.** The corpus bursae is rounded, about 0.6 × as long as the heavily sclerotized, parallel-sided ductus bursae, and gives rise to a rounded lightly sclerotized appendix bursae ventrally at the junction with the ductus bursae. The sclerotized plate in the ostium bursae has a wide V-shaped notch on the posterior margin.

Distribution and biology. *Bryolymnia semifascia* occurs from northern Colorado and southern Utah southward to southeastern Arizona and south-central New Mexico. Adults have been collected from mid-June to mid-September in conifer forests.

***Bryolymnia viridata* (Harvey, 1876), comb. n.**
Figs 23, 24, 33, 41

Jaspidea viridata Harvey 1876: 35.

Type material. Holotype ♂. Location of type unknown. Type locality: USA, California, San Diego.

Other material examined and distribution. USA: California: Alameda Co., Los Angeles Co., San Diego Co., Sonoma Co.

Remarks. This species previously has been associated with the genus *Cryphia* Hübner in the Bryophilinae. Chris Schmidt, working with DNA barcodes of *Cryphia* species noted that *Cryphia viridata* associated with *Bryolymnia*. Examination of the male genitalia confirmed this generic association. The male genitalia are more weakly sclerotized than most other Elaphriini, but the membranous transverse postmedial suture of the sacculus, and the membranous weak area on the costal margin of the valve associate this species with the Elaphriini, and the sclerotized plate on the dorsal rod extending from the base of the clasper to the dorsal margin of the valve associates it with *Bryolymnia* within the Elaphriini.

Diagnosis. *Bryolymnia viridata* differs from all other congeners in the genus in having the forewing ground color almost entirely green. There usually is some fuscous shading over the ground, especially in the subterminal area, but not in the terminal area. In most specimens there is dark fuscous or black shading between the reniform and orbicular spots, on the costa above the orbicular spot, representing the upper part of the medial line, and on the costal part of the subterminal area. A rounded spot in the fold, possibly derived from the claviform spot, looks like a second orbicular spot and often has a similar dark central dot. The terminal line is a series of black dashes between the wing veins, and this in combination with a white fringe with black wedge-shaped spots at the end of the veins, give the fringe a checkered pattern. Forewing length ranges from 12 to 15 mm. The hindwing is white with a variable amount of fuscous on the veins, discal spot, postmedial line and terminal line. Females tend to have more fuscous shading in these areas than do males. **Male genitalia.** The valve is more oval than in other species of *Bryolymnia*, broader mesially and tapered apically with the cucullus not differentiated from the rest of the valve and the apical corona weak and confined to the dorsal half of the outer margin. The clasper has a slight subbasal tooth dorsally and ventrally, and the sclerotized dorsal lobe on the dorsal rod extending from the base of the clasper is somewhat inflated and lobed, not a flat rounded plate as in most other species. The uncus is broad mesially and tapered toward each end, unlike other species. Both the aedeagus and vesica are unarmed, the latter being about as long as the aedeagus, slightly swollen at the base, then tapered to the apex. **Female genitalia.** The corpus bursae is oval, about 2 × as long as the ductus bursae, without signa, and with the ductus seminalis on a small appendix bursae posteriorly on the left. The posterior 1/3 of the ductus bursae is heavily sclerotized and this expands into a broad U-shaped ostium bursae with a very slightly convex posterior margin.

Distribution and biology. *Bryolymnia viridata* occurs in western California from Sonoma County north of San Francisco southward to San Diego County. Adults have been collected late May to mid-October.

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